

**ABSTRACT**  
**AN OPTICAL WAVEGUIDE STRUCTURE**

An optical waveguide structure according to the invention comprises a core layer having a first refractive index  $n_{core}$ , an array of sub-regions within the core having a second refractive index  $n_{rods}$ , the array of sub-regions giving rise to a photonic band structure within the core layer, and a cladding layer adjacent to the core layer having a refractive index  $n_{cladding}$ , wherein:

$$n_{core} > n_{rods} \exists n_{cladding} \text{ and } n_{core} - n_{rods} > 0.1.$$

The structure of the present invention is less lossy than prior waveguide structures having photonic bandstructure regions. The out of plane divergence of light in the sub-regions is reduced as compared with air holes which are typically used in photonic crystal structures. As a result more light is coupled back into the core at the sub-region/core interface. Coupling of light into the buffer layer is also reduced. Furthermore, there are added advantages over the prior art associated with the fabrication of these structures.

(Figure 2)